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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/576,755

08/09/2006

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EXAMINER

HARRIS, GARY D

ART UNIT

PAPER NUMBER

1785

NOTIFICATION DATE

DELIVERY MODE

05/14/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/576,755	Applicant(s) SONOBE ET AL.	
	Examiner GARY D. HARRIS	Art Unit 1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,11 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 6, 11 & 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/16/2010 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 & 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Usuki et al. JP 2003-272121 published 9/26/2003.

As to Claim 1, Usuki discloses a perpendicular magnetic recording disk for use in perpendicular magnetic recording (see abstract). The perpendicular magnetic recording disk includes a substrate (Paragraph 4), a soft magnetic layer of a material selected

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from a group consisting of an Fe-based material and a Co-based material on said substrate (Paragraph 31 & 52, Permalloy and/or amorphous, Paragraph 14 & 50). A magnetic recording layer is on the soft magnetic layer (see figure 1). The ferromagnetic layer on the soft magnetic layer has a granular structure (non-magnetic metal oxide), and includes crystal grains mainly made of cobalt (Co) (Paragraph 7). The grain boundary portions are mainly made of SiO₂ (Paragraph 15). A layer on the ferromagnetic layer does not have a granular structure and is from a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Paragraph 12 & 13). The content of the SiO₂ in the granular ferromagnetic layer is 6at% or more (Paragraph 16). The perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer having the granular structure, and then a layer having no granular structure (Paragraph 8).

As to Claim 5, Usuki discloses perpendicular magnetic recording disk using a spacer layer (foundation layer) selected from a Pd and Pt between the ferromagnetic layer and the layer having no granular structure (Paragraph 29). The layer having no granular structure is a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Paragraph 3, 4 & 10).

As to Claim 11, Usuki discloses a perpendicular magnetic recording disk with an underlayer and a Ru layer provided between the soft magnetic layer and the ferromagnetic layer (Paragraph 50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Usuki et al. JP 2003-272121.

As to Claim 6, Usuki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording (see abstract). The disk includes a soft magnetic layer of a material selected from a group consisting of an Fe-based material and a Co-based material on a substrate (Paragraph 31 & 52, permalloy). A magnetic recording layer is on the soft magnetic layer (Paragraph 12 & 13). The method includes a step of forming magnetic recording layer comprising, on the

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soft magnetic layer (Paragraph 18, 22). A ferromagnetic layer is made of a granular structure comprising SiO₂ between crystal grains comprising cobalt (Co) (Paragraph 27). The SiO₂ content in the ferromagnetic layer is 6at% or more (Paragraph 16). A layer on the ferromagnetic layer does not have a granular structure and includes a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Paragraph 12 & 13). Forming the ferromagnetic layer on the soft magnetic layer is done by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The process continues with forming a layer having no granular structure with a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The method of manufacturing the perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer having the granular structure, and then a layer having a magnetic layer with no granular structure (Paragraph 8).

Usuki is silent with regard to the sputtering gas pressure lower than the gas pressure when forming the ferromagnetic layer.

However, Usuki discloses the anisotropy magnetization and the orientation of the magnetic layers can be adjusted with the argon pressure (Paragraph 14). Additionally, the forming temperature was adjusted in the Usuki invention to improve the coercive force (Paragraph 77) and the use of vacuum deposition and the sputtering using direct current (DC) sputtering methods in an argon environment or with a small amount of oxygen introduced to adjust the non-magnetic metal oxide content (Paragraph 18).

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It would have been obvious to one skilled in the art to lower the gas pressure when forming the ferromagnetic layer in order to change the anisotropy magnetization as taught by Usuki. One would have been motivated to change the conditions of the sputtering environment in order to change the magnetic orientation. One of ordinary skill would have recognized that changing the pressure, temperature, voltage, current, gas, and flow rate in a sputtering environment would result in a change in the magnetic properties in a magnetic recording medium.

As to Claim 12, Usuki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording and having at least a soft magnetic layer of a material selected from a group consisting of an Fe-based material and a Co-based material on a substrate (Paragraph 31 & 52, permalloy). An underlayer including Ru on said soft magnetic layer (Paragraph 50).

The method includes a step of forming magnetic recording layer comprising, on the soft magnetic layer (Paragraph 18, 22). A ferromagnetic layer is made of a granular structure comprising SiO₂ between crystal grains comprising cobalt (Co) (Paragraph 27). The SiO₂ content in the ferromagnetic layer is 6at% or more (Paragraph 16). A layer produced on the ferromagnetic layer that does not have a granular structure includes a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Paragraph 12 & 13). Forming the ferromagnetic layer on the soft magnetic layer is done by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The process continues

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where forming the layer having no granular structure with a CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The method of manufacturing the perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer having the granular structure, and then a layer having a magnetic layer with no granular structure (Paragraph 8).

Usuki is silent with regard to the sputtering gas pressure lower than the gas pressure when forming the ferromagnetic layer.

However, Usuki discloses the anisotropy magnetization and the orientation of the magnetic layers can be adjusted with the argon pressure (Paragraph 14). Additionally, the forming temperature was adjusted in the Usuki invention to improve the coercive force (Paragraph 77) and the use of vacuum deposition and the sputtering using DC sputtering methods an argon environment or with a small amount of oxygen introduced to adjust the non-magnetic metal oxide content (Paragraph 18).

It would have been obvious to one skilled in the art to lower the gas pressure when forming the ferromagnetic layer in order to change the anisotropy magnetization as taught by Usuki. One would have been motivated to change the conditions of the sputtering environment in order to change the magnetic orientation. One of ordinary skill would have recognized that changing the pressure, temperature, voltage, current, gas, and flow rate in a sputtering environment would result in a change in the magnetic properties in a magnetic recording medium.

Restriction

Claim 6 & 12 are directed to a method of forming, a restriction has not been made between the method and article claims as no substantive limitations have been presented at this time. The examiner notes if applicant amends method claims and adds substantive limits a restriction may be required at that time.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785

/G. D. H./Gary Harris
Examiner, Art Unit 1785